WHAT IS CLAIMED IS:

- 1. A system for generating thermal imagery using an MR scanner comprising:
 - an RF coil;
 - a tuning means connected to the RF coil;
 - a pre-amp connected to the tuning means;
 - a demodulator connected to the output of the pre-amp;
 - a digitizer connected to the output of the demodulator; and
- a computer connected to the output of the digitizer, the computer having a computer readable medium encoded with a program for collecting noise signals detected by the RF coil, calculating a variance of the noise signals, and converting the variance to a temperature.
- 2. The system of claim 1, further comprising a means for steering a field of view of the RF coil.
- 3. The system of claim 1, further comprising:
 - a main magnet substantially surrounding the RF coil; and
 - a gradient magnet substantially surrounding the RF coil.
- 4. The system of claim 1, wherein the tuning means comprises:
 - a network analyzer; and
 - a non-magnetic variable capacitor.
- 5. A method for using an MR scanner to measure absolute temperature of a target volume, the method comprising the steps of:

tuning an RF coil;

collecting a plurality of signal data from the RF coil; determining a variance corresponding to the plurality of signal data; and converting the variance to an absolute temperature data.

- 6. The method of claim 5, further comprising the steps of: storing the absolute temperature data; and steering a field of view of the RF coil.
- 7. The method of claim 5, further comprising the steps of:
 retrieving the stored absolute temperature data; and
 displaying an image corresponding to the stored temperature data and the field of
 view of the RF coil.
- 8. The method of claim 5, wherein the step of converting the variance to an absolute temperature comprises the step of multiplying the variance by a calibration coefficient.
- 9. The method of claim 5, further comprising the step of setting a bandwidth, before the step of collecting a plurality of signal data.
- 10. The method of claim 5, further comprising the step of setting a center frequency before the step of tuning an RF coil.

- 11. The method of claim 5, wherein the step of determining a variance corresponding to the plurality of signal data comprises the step of histogramming the plurality of signal data.
- 12. The method of claim 5, further comprising the step of setting a number of samples corresponding to the plurality of signal data.
- 13. The method of claim 5, wherein the step of collecting a plurality of signal data comprises the step of removing outlier data from the plurality of signal data.
- 14. A method for calibrating an MR scanner for measuring absolute temperature of a target volume, the method comprising the steps of:

placing a first phantom having a first temperature within a field of view of an RF coil; tuning the RF coil;

collecting a first plurality of signal data from the RF coil;

determining a first variance corresponding to the first plurality of signal data;

placing a second phantom having a second temperature within the field of view of the RF coil;

collecting a second plurality of signal data from the RF coil;

and

determining a second variance corresponding to the second plurality of signal data;

computing a calibration coefficient corresponding to the relation between the first and second temperature and the first and second variance.

- 15. The method of claim 14, further comprising the step of setting a bandwidth before the step of collecting a first plurality of signal data.
- 16. The method of claim 16, wherein the calibration coefficient corresponds to the bandwidth.
- 17. The method of claim 14, further comprising the step of setting a number of samples corresponding to the plurality of signal data before the step of collecting a first plurality of signal data.
- 18. The method of claim 18, wherein the calibration coefficient corresponds to the number of samples.
- 19. The method of claim 14, further comprising the step of storing the calibration coefficient after the step of computing the calibration coefficient..
- 20. A computer readable medium encoded with a program comprising the steps of: issuing an instruction to tune an RF coil; collecting a plurality of signal data from the RF coil; determining a variance corresponding to the plurality of signal data; and converting the variance to an absolute temperature data.

- 21. The computer readable medium of claim 21, wherein the program further comprises the step of issuing an instruction to steer a field of view of the RF coil, before the step of collecting a plurality of signal data.
- 22. The computer readable medium of claim 22, wherein the program further comprises the steps of:

storing the absolute temperature data; and storing data corresponding to the field of view of the RF coil.

23. The computer readable medium of claim 23, wherein the program further comprises the steps of:

retrieving the absolute temperature data;

retrieving the data corresponding to the field of view of the RF coil; and constructing an image of the absolute temperature data.+

24. A method for generating thermal imagery of a tissue, the method comprising the steps of:

measuring a magnetic field sensitivity distribution;

estimating an electric field distribution corresponding to the magnetic field sensitivity distribution;

measuring an RF coil impedance;

estimating an electrical conductivity distribution corresponding to the impedance and the electrical field distribution; and

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estimating a temperature distribution corresponding to the electrical conductivity distribution and the electric field distribution.